

PRIMARY USE: Improve the habitat for aquatic plants and animals.
ADDITIONAL USES: Increase channel depth.

BOULDER CLUSTERS

What is it? This is a technique in which a group of boulders are placed either randomly or selectively, in clusters and/or individually (depending on the pattern of natural boulders in the reach), at strategic points along a channel bed.

Purpose

Boulder clusters provide overhead cover and create deep areas which are used by juvenile fish as resting areas. They can restore meanders in channelized reaches, protect eroded banks by deflecting flow, and improve gradation of substrate materials.

Boulder Clusters Perspective View



Limitations

Boulders may not be available at project site. Current speed must exceed 2 ft (0.6 m)/second for this to be an effective technique. Heavy equipment may be necessary to place boulders. Small boulders may eventually be covered by channel aggradation.

Materials

Large 3-5 ft (0.9-1.5 m), irregularly shaped, angular boulders provide the most hiding spaces. Quarry rock is preferable since it will not usually require anchoring or lacing together as more rounded or smaller boulders do.

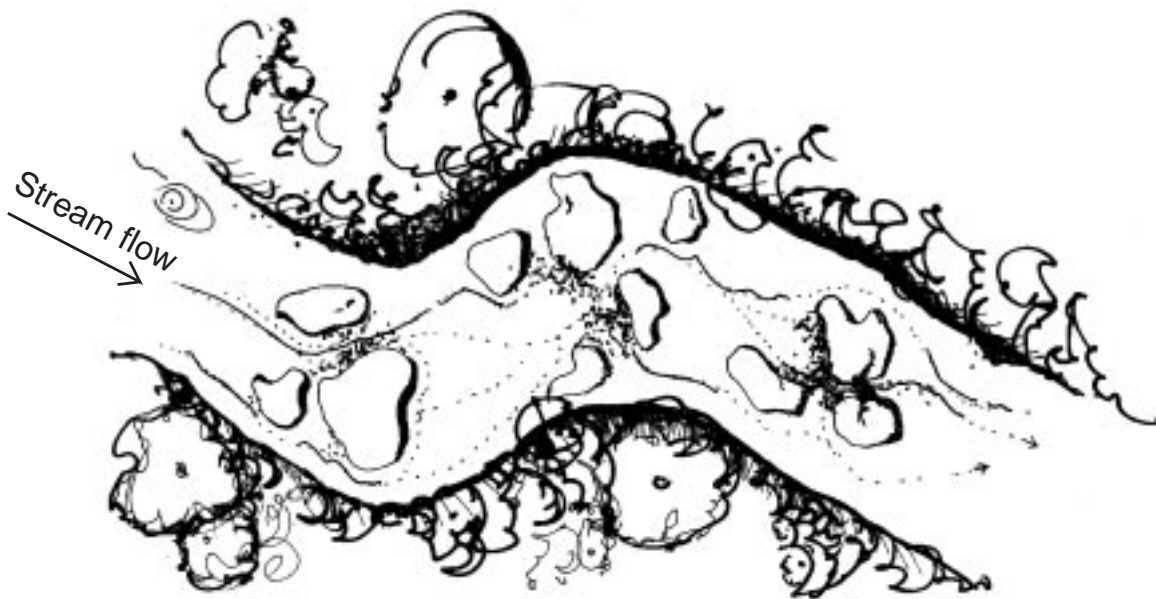
Installation

Minimize disturbance to the stream and adjoining areas by scheduling the work when it will interrupt aquatic plants and animals the least. Select stable stream reaches which are not likely to degrade and undermine rock placements. Boulders can be placed in riffles, runs, flats, glides, and open pools. Embed the boulders a short distance into the stream bed in a triangular pattern with spaces between the boulders ranging from 6 in (152 mm) to 1 ft (0.3 m). This spacing provides cover and other habitat niche needs, and ensures the creation of scour pockets. Boulders should be placed in the middle half of the channel where deposition is not expected to occur. A suggested spacing of clusters within the same stream segment is one-third of the stream width apart. Avoid locations where placement could divert the stream channel's thalweg or threaten impingement on potentially unstable stream banks.

Source: Stream Corridor Restoration Handbook, USDA.

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Additional Drawings:



**Boulder Clusters
Plan View**